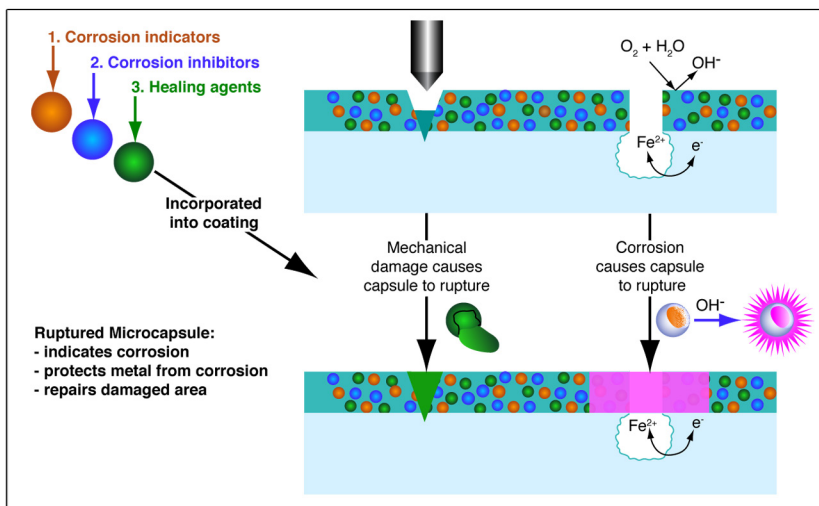


John F. Kennedy Space Center's Smart Coating for Corrosion Detection and Protection



The National Aeronautics and Space Administration (NASA) seeks partners interested in the commercial application of the Smart Coating for Corrosion Detection and Protection. Researchers at NASA Kennedy Space Center's (KSC) Corrosion Technology Laboratory have developed a smart, environmentally friendly coating system for early detection and inhibition of corrosion and self-healing of mechanical damage without external intervention. This coating will have the inherent ability to detect the onset of corrosion in the coated substrate and respond autonomously to control it.

The high salt content of KSC's natural marine environment in combination with the sunlight, heat, and humidity of the subtropical Florida climate makes KSC the country's most corrosive area according to the American Society of Metals. These highly

BENEFITS

- Autonomous corrosion detection and protection
- Early corrosion detection and hidden corrosion indication
- Environmentally friendly
- Self-healing of mechanical damage
- On-demand delivery of corrosion inhibitors

opportunity

APPLICATIONS

As a corrosion detection and prevention coating for:

- Bridges
- Automobiles
- Ships
- Pipes and other infrastructure
- Machinery
- Airplanes

TECHNOLOGY STATUS

- ☒ Patents pending
- ☒ U.S. patent
- ☐ Copyrighted
- ☒ Available to license
- ☐ Available for no-cost transfer
- ☒ Seeking industry partner for further codevelopment

corrosive conditions are exacerbated at KSC's launch pads by extreme heat and acidic exhaust from the solid rocket motors of the space vehicles. A more advanced method of protection is needed.

Technology Details

The smart coating is based on the controlled release of corrosion inhibitors and indicators from specially formulated microcapsules and particles pioneered by NASA (patent allowed). The coating detects corrosion in its early stages, inhibits it, and/or repairs the coating. The onset of corrosion triggers the release of compounds that indicate and inhibit corrosion. Mechanical damage to the coating triggers the release of film-forming compounds to repair the damage. In practice, the corrosion-responsive microcapsules detect the chemical changes that occur when corrosion begins and respond by releasing their contents. A corrosion indicator will identify the affected region with a color change, and healing agents and corrosion inhibitors help mitigate the corrosion.

The microcapsules can be tailored for incorporation into different coating systems. This multifunctional coating system will reduce maintenance cost and improve safety by preventing catastrophic corrosion failures. The coating can reduce infrastructure life cycle costs by extending the life of corrosion-susceptible structures and components, reduce inspection times of structures, and reduce the level of repair for corrosion-affected areas.

Partnership Opportunities

NASA has three U.S. patents pending and holds one patent on the technology, for which licensees are sought. NASA has the authority to grant licenses on its domestic and foreign patents and patent applications pursuant to 35 U.S.C. 207-209. NASA has implemented this authority by means of the NASA Patent Licensing Regulations, 37 CFR §404. All NASA licenses are individually negotiated with the prospective licensee, and each license contains terms concerning commercialization (practical application), license duration, royalties, and periodic reporting. NASA patent licenses may be exclusive, partially exclusive, or nonexclusive. If your company is interested in the new Smart Coating for Corrosion Detection and Protection, or if you desire additional information, please reference Case Number KSC-12723 and contact:

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